Microline Surgical Endo Clip Redesign

Project Recap

For this project, the group developed a bendable end piece for laparoscopic surgical instruments manufactured by Microline Surgical. Laparoscopic surgery, also known as minimally invasive surgery, is a process by which small incisions are made into the patient’s abdomen and a laparoscope is then inserted into the body to visualize internal body conditions. The bendable end piece will give surgeons the ability to control the end of the tool that is responsible for applying clips that fasten tissues together. Currently, the tool is unable to bend in any direction and surgeons must limit their operations to use only linear tool movements.

The customer needs were as followed; the tool tip must have controlled bending, articulate 90 degrees, have the ability to hold three clips, and advance the clips in the straight position. The redesign must also be scaled six times the actual size of 5mm in diameter and be compatible with Microline’s current clip and jaw designs.

With these customer needs in mind, background research was performed in order to facilitate the concept selection process and to successfully manufacture a working prototype. Several existing products were investigated through a patent search to aid in the concept generation process and to help create an original design. The four design concepts initially considered were a crank-slider mechanism, an electromagnetic coil actuator, a spring and cable mechanism, and a cable array assembly.

One of the concepts was selected and manufactured. A series of tests were performed on the prototype. One included a force vs. deflection test which was performed to determine the input force that is required for the tool tip to bend 90 degrees. The final prototype was able to bend 90 degrees with an input force of 8.4 Newtons.

The budget for the project was $1250. The project was completed under budget and ahead of schedule. The team spent only $800 with the main cost being the travel to Microline Surgical located in Boston, Massachusetts.

The team successfully redesigned Microline’s Endo Clip which improved many of its features. This will make an impact on a patient’s life and change the way surgeons perform laparoscopic surgery. The redesign is able to have a controlled motion, articulate 90 degrees, hold three clips, and advance the clips in the straight position. Overall, the project has been a successful and enjoyable learning experience.

Due to IP restrictions, detailed information on the redesign cannot be shown.